

NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIFORNIA



THESIS

EXIT STRATEGY IN THE IMPLEMENTATION OF INFORMATION TECHNOLOGY SYSTEMS

by

Todd W. Pugh

September 1997

Thesis Advisor:
Associate Advisor:

William J. Haga
Barry Frew

Approved for public release; distribution is unlimited.

Thesis
P9476324

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

| | | | | |
|---|--|---|---|--|
| 1. AGENCY USE ONLY (Leave blank) | | 2. REPORT DATE September 1997 | 3. REPORT TYPE AND DATES COVERED Master's Thesis | |
| TITLE AND SUBTITLE EXIT STRATEGY IN THE IMPLEMENTATION OF INFORMATION TECHNOLOGY SYSTEMS. | | | 5. FUNDING NUMBERS | |
| 6. AUTHOR (S) Pugh, Todd W. | | | | |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey CA 93943-5000 | | | 8. PERFORMING ORGANIZATION REPORT NUMBER | |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) | | | 10. SPONSORING/MONITORING AGENCY REPORT NUMBER | |
| 11. SUPPLEMENTARY NOTES: The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. | | | | |
| 12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited. | | | 12b. DISTRIBUTION CODE | |
| 13. ABSTRACT (maximum 200 words) This thesis proposes that planning for the implementation of information technology projects include an exit strategy. The military origins of exit strategy are reviewed along with corporate formulations of exit strategies in plans for non-technology investments. Cultural, political and organizational barriers to exit strategy are considered. Suggestions are made for further research. | | | | |
| 14. SUBJECT TERMS Information Technology, Systems Management, Exit Strategy, Implementation, System Development Life Cycle | | | 15. NUMBER OF PAGES 69 | |
| | | | 16. PRICE CODE | |
| 17. SECURITY CLASSIFICATION OF REPORT Unclassified | 18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified | 19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified | 20. LIMITATION OF ABSTRACT UL | |

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18 298-102

Approved for public release; distribution is unlimited.

EXIT STRATEGY IN THE IMPLEMENTATION
OF INFORMATION TECHNOLOGY
SYSTEMS

Todd W. Pugh
Lieutenant, United States Navy
B.S., The Citadel, 1988

Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY
MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
September 1997

NPS ARCHIVE
1997.09
PUGH, T.

~~170512~~
~~PP476324~~
~~C. 2~~

ABSTRACT

This thesis proposes that planning for the implementation of information technology projects include an exit strategy. The military origins of exit strategy are reviewed along with corporate formulations of exit strategies in plans for non-technology investments. Cultural, political and organizational barriers to exit strategy are considered. Suggestions are made for further research.

TABLE OF CONTENTS

| | |
|--|----|
| I. INTRODUCTION | 1 |
| A. THESIS | 1 |
| B. IMPORTANCE OF INFORMATION TECHNOLOGY..... | 1 |
| C. THE DIFFICULTIES OF TECHNOLOGY IMPLEMENTATION IN THE DEPARTMENT OF DEFENSE | 3 |
| D. CORPORATE PERSPECTIVE ON IT IMPLEMENTATION | 4 |
| II. INFORMATION TECHNOLOGY PROJECTS THAT FAILED | 9 |
| A. FUNDAMENTAL CHALLENGE | 9 |
| B. CASE 1: CALIFORNIA DEPARTMENT OF MOTOR VEHICLES..... | 9 |
| C. CASE 2: CALIFORNIA STATEWIDE AUTOMATED WELFARE SYSTEM..... | 11 |
| D. CASE 3: FEDERAL GOVERNMENT IT FAILURES | 15 |
| E. SUMMARY | 19 |
| III. EXIT STRATEGY | 21 |
| A. BACKGROUND..... | 21 |
| B. ORIGINS OF CONCEPT | 22 |
| C. WEINBERGER DOCTRINE | 23 |
| D. LITERATURE REVIEW | 25 |

| | |
|--|----|
| IV. EXIT STRATEGIES IN CORPORATE PLANNING..... | 29 |
| A. THE REAL ESTATE INDUSTRY..... | 29 |
| B. INTERNATIONAL BUSINESS MACHINES..... | 30 |
| C. TRAMMELL CROW..... | 30 |
| D. CB COMMERCIAL BROKERAGE..... | 32 |
| E. MCCABE-HENLEY..... | 33 |
| V. CONCLUSIONS | 35 |
| APPENDIX A: HONG KONG TRADELINK | 39 |
| A. BACKGROUND..... | 39 |
| B. ELECTRONIC DATA INTERCHANGE ISSUE | 40 |
| LIST OF REFERENCES | 55 |
| INITIAL DISTRIBUTION LIST | 59 |

ACKNOWLEDGMENT

I thank my mother, Glenda Pugh, not only for her support in all of my crazy endeavors but also for providing me with the genesis for this thesis. It was her trust in a fresh college graduate that caused her to buy a “state-of-the-art” Apple II GS computer to further her two youngest son’s education. That computer still sits proudly in the family living room, having been used fewer times than I’ve checked my e-mail today.

Your lesson on the importance of an education has not gone unheeded by any of your three sons. Thanks.

I. INTRODUCTION

A. THESIS

Sometimes, the most obvious things in life go unnoticed. Corporate executives, who have built successful careers hedging decisions by planning for countless “what if” scenarios, fail to consider the consequences of an Information Technology (IT) systems implementation failure. The System Development Life Cycle (SDLC) process needs to be modified to include an exit strategy in the planning stages. If the planning process in the SDLC [Sridhar, 1996] for information technology based systems is not changed, significant resources will be wasted or an inferior product will be delivered. An exit strategy would evaluate the cost benefit of the technology change based on an established set of system performance measures [Schneidewind, 1996].

Key benefits of evaluating the proposed change periodically and making a decision on the margin [Haga, 1996] as to continue the project as planned or invoke an exit strategy are that resources are not wasted or an inferior product is not delivered upon completion. With a formal exit strategy included in the SDLC methodology, planners can distance themselves from a personal sense of responsibility for technology project failures and make better program management decisions.

B. IMPORTANCE OF INFORMATION TECHNOLOGY

Information technology is playing an ever-increasing role in our society. In 1994, 35 percent of American families (50 percent of American teenagers) had a

personal computer at home and over 30 million people were estimated to be linked to the Internet. The average automobile in 1995 had over 50 microprocessors and Internet growth was projected to be over 10 percent per month [Negroponte, 1995]. A 1997 Ford Taurus has more computing power than the original Apollo moon lander [Trotman, 1997].

Toffler [1993] was the first to recognize the ongoing shift to a dependence on information and information based technology in the way businesses do business and has described it the coming of the Third Wave. Information will be to businesses of the twenty-first century what capital and labor were to the industrial revolution. Toffler contends that the changes in the way businesses operate in the future will be as dramatic as the shift from an agrarian based (first wave) society to an industrial based (second wave) society were at the turn of the twentieth century and will affect the whole of society.

Information will be treated as a raw material in the business process and will be treated as a strategic resource. "While the value of a Second Wave company might be measured in terms of its hard assets like buildings, machines, stocks and inventory, the value of successful Third Wave firms increasingly lies in their capacity for acquiring, generating, distributing, and applying knowledge strategically and operationally" [Toffler, 1993]. The technology used to gather and interpret this resource will be crucial to the success or failure of any business venture.

C. THE DIFFICULTIES OF TECHNOLOGY IMPLEMENTATION IN THE DEPARTMENT OF DEFENSE

As important as information based technology has become in today's society, the methodology for its development is still imperfect. In a major study of software engineering projects [Gibbs, 1994], the following trends were identified:

- For every six large software projects that are undertaken, two are canceled.
- The average software development project overshoots its development time by 50 percent.
- The larger the software development project, the lower the probability that it will be completed.
- Three quarters of all large software projects are operating failures that either do not function as planned or are not used at all.

In Saiedian and Kuzara's [1995] study of information technology projects within the Department of Defense he noted that:

- Prospective users of a system under development either do not accurately or completely communicate their requirements for the system.
- A review of 17 major Department of Defense software contracts found that the average 28-month schedule was missed by 20 months.
- None of the 17 projects was delivered on time.
- One four-year project took seven years.

It is easy to understand with these kinds of results why there is so much apprehension over IT system purchases.

D. CORPORATE PERSPECTIVE ON IT IMPLEMENTATION

American corporations spent an estimated \$275 billion in 1996 to improve information technology. Money well spent? Not all of it according to Standish Group International, a market research firm. Their research of these IT projects [Shailaja, 1996] shows that a full one third of the money was essentially wasted. That the projects yielded no real, or even in some cases a negative, return on the investment. The following seven corporate executives talk about their technology acquisition difficulties and how they failed to plan for failure.

1. Douglas Schwinn: Senior Vice President Information Systems, FoxMeyer Drug Company (now McKesson Corporation).

FoxMeyer Drug Company spent \$18 million to open a new warehouse with automated pricing and picking devices that move products around on a conveyor belt. The system was developed by an outside consultant. FoxMeyer was a “just in time” distributor. They take orders late at night and deliver early the next morning. They handle thousands of these types of orders every day.

“The system blew up on us. It couldn’t handle the volume of data and kept shutting down. Once we started it up again, it lost chunks of data about the orders. People were running frantically all night from shelf to shelf trying to get orders in,” said Schwinn [Shailaja, 1996]. FoxMeyer lost millions compensating customers for late arrivals. They lost even more money air shipping orders that normally would have been trucked.

The system was known to be flawed by executives on the launch date, but the company had already shut down its other two warehouses. They depended on a product that wasn’t fully developed and did not have a plan in case of its

failure. In fact, according to Schwinn, “it helped send us into bankruptcy. What did we learn? Not to be over impressed by technology.”

2. Richard Liddy: Chief Executive, General American Life Insurance.

Great American Life Insurance’s in-house technologists devoted six years and \$1.6 million to developing an information system for its reinsurance business. The resultant product was slow and cumbersome. Every time a change was made in the way a new premium was calculated, programmers had to redo the software as the code level.

Lloyd Sloan, one of General American’s senior insurance agents, was a former mathematics teacher at a local college. He kept suggesting that the company move away from the mainframe architecture to a more decentralized system. This would place the tools for software development in the hands of the end-users. But Great America’s executives listened to the technology staff and continued to invest in the mainframe system.

Finally, they decided to let Sloan develop a networked PC based system even though he had no technical degree. When the technology systems people were told that Sloan was taking over the project, they were shocked-but glad to get rid of it. “The new system is going to fall flat on its face, but don’t call us to come back and pick up the pieces,” they said. “Well it did work,” said Liddy, “and the lesson that we learned is that it’s sometimes better to have someone who knows the business working on the technology than someone who knows the technology but not the business” [Shailaja, 1996].

**3. Dan Potter: Founder and President, 1-800-CONTRACTOR
(A construction referral service covering southern California).**

Dan Potter and a partner started 1-800-CONTRACTOR in 1994, and it has been growing so quickly that they were constantly buying new computers. As a cash strapped startup, they made a common mistake of trying to reduce costs by buying the cheapest computers available. "The computers kept quitting and freezing on us," said Potter. "It would take four trips to the store to return a monitor. When we got totally fed up, we sold them off at a worse discount than we bought them."

They then changed their strategy and went to the other extreme. They bought top-of-the-line computers and ended up spending a lot more than necessary. "Now we are sticking with mid-level stuff assembled locally by PC Club, a bare-bones wholesaler nearby. Their quality is comparable to the best and we get better service, because they are local. My motto, which I learned the hard way, is that \$2,000 is the right amount to pay for a computer" [Shailaja, 1996].

4. Joseph Durocher: Chief Information Officer, Hilton Hotels corp.

In 1988 Hilton, Marriott, Budget Rent a Car and AMR Information Services spent \$125 million to develop a consolidated reservation system called Confirm. The technology systems analysts at the combined companies started the developmental process with a bland piece of paper.

"It was just too big and complicated a project with too many experts involved," said Durocher. In 1992 they canceled the Confirm system. They have gone back to HILTRON, their original worldwide reservation system, which they

had developed incrementally for decades. “We learned that one needs to develop systems and implement them in little bits. Developing from scratch is the last resort.” [Shailaja, 1996]

5. Thomas Higgerson: Senior Vice President, Hygrade Distribution & Delivery

“We try to be bleeding-edge in the technology we use, but being a leader means that sometimes we pay the price,” said Thomas Higgerson of Hygrade Distribution & Delivery. Hygrade Distribution & Delivery developed a \$1.5 million warehouse-management system for Federated Department Stores to link them to their manufactures. Customers do not like to wait for delivery and stores do not like to carry big inventories of high cost merchandise. Federated had hoped to use the system to speed up delivery of these big-ticket items. Using the system, each store would be hooked up via computer with the manufacturer and electronically transmit the customer’s order. The proposed system would then generate the delivery schedules immediately.

The six-month pilot test worked beautifully. But when the new system was integrated into all of Federated’s stores, Higgerson realized that the concept was bankrupt from the start. Every Federated store, be it Macy’s, Sterns or Bloomingdale’s, does its buying individually from different manufactures. The system that was designed required centralized buying. “We learned we need to know our clients a lot better. We can’t be cutting-edge with every account.” Said Higgerson, “Next time we will work with clients who have centralized purchasing, like Kmart and Wal-Mart” [Shailaja, 1996].

6. Kurt Lieberman: Vice President, Support Services, Reynolds & Reynolds (supplier of information systems to the automotive and health care industries).

When Reynolds & Reynolds needed a new software program to control their distribution they bought it from a vendor with a much-touted hot technology. After they installed the new software, they realized the program could not handle their complex scheduling.

"It's ironic," said Lieberman, "Technology is our business and yet we got taken. The software simply looked very snappy, it had lots of colorful graphics and seemed easy to use." The company was forced to go back to their old program and have internal programmers upgrade that system. Said Lieberman, "The biggest lesson we learned was don't be taken in by glamorous looks and buzzwords" [Shailaja, 1996].

7. Dr. Edith Martin: Chief Information Officer, Eastman Kodak.

In 1990 Eastman Kodak outsourced its telephone and computer networks in an attempt to focus on their core businesses. After a complicated bidding process, a five-year contract was awarded to Digital Equipment.

The contract was voided and the services were contracted from Nortel in 1993. "We didn't think the telephone system was good enough, or that Digital could improve it," said Martin. "What did we learn? Not to outsource an activity to an organization, no matter how capable it is, unless it's their core competence" [Shailaja, 1996].

II. INFORMATION TECHNOLOGY PROJECTS THAT FAILED

A. FUNDAMENTAL CHALLENGE

It is easy to see why so many corporations fall short of expectations in their efforts to invest in information systems. In 1965, Gordon Moore (co-founder of Intel) predicted that transistor density of semiconductor chips would double roughly every 18 months [Lazowska, 1996]. That is, the amount of information storable on a given amount of silicon (chip) has doubled every 18 months since the technology was invented. This law has also been found to be true in predicting the speed at which the operations that can be performed by computers.

Richard W. Hamming, formerly of Bell Labs and now a Distinguished Professor at the Naval Postgraduate School, equates a 10-fold increase in performance with a generational change in the way we do business [Hamming, 1996]. Combining these two laws we can extrapolate that the fundamental way that businesses do business through the use of advanced technology will change dramatically every 5 years. With that short a time horizon it is easy to see how companies fail to keep pace with the developments in technology.

The following four case studies show how dramatic the consequences can be when Information Technology (IT) projects fail.

B. CASE 1: CALIFORNIA DEPARTMENT OF MOTOR VEHICLES

California Department of Motor Vehicles managers who spent \$44.3 million on a computer system that doesn't work "succumbed too readily to

industry hype” and couldn’t supervise the technocrats on their staff, according to an internal report on the failed project. DMV officials also underestimated the massive task of moving their database from one operating system to another and configuring it so information could be quickly retrieved, the report said.

The document, called special Project Report 94, was compiled last year while the current DMV director, Frank Zolin, was seeking clearance from Wilson administration officials to scuttle the project. When the new computer system was planned in 1987, it was to cost \$28.5 million and be operating by 1993. But by late last year, \$44.3 million had been spent and the system still wasn’t working. When Zolin “pulled the plug,” the total projected cost had grown to \$185 million and the completion date extended to 1998.

From the beginning, investigators found, high-ranking officials were taken with the idea that the new system could utilize the most advance technology available. That might have been possible with a smaller scale project, it suggested, but the DMV maintains records on more than 38 million vehicles and vessels, 31 million drivers and 232,500 occupational licenses for workers such as bus drivers. The primary contractor, Tandem Computers Inc. of Cupertino touted capabilities for its equipment that could not be achieved, the report continued.

“The practicalities of what was being promoted by the technical industry were overly optimistic, which is often the case,” the report said. “Management should have taken a more cautious approach.”

A.A. Pierce, who now heads the state lottery, was DMV director at the time. Pierce said through a spokesman that he had not seen the report and

didn't want to comment. Bruce Dougherty, Tandem's vice president of solutions marketing, said, "from the standpoint of what we were asked to do, we've done it." He said that Zolin told a legislative committee last week that the principle problem had been in the software application and use, not in the hardware. "We never had the responsibility ... for the software application development," Dougherty said.

Much of the problem, the report concluded, involved a decision to use a "relational" data base management system, which would have given users great flexibility to pull diverse bits of data together quickly. But with the DMV's need to handle more than 1 million data transactions daily, a relational system can't handle the load, the report said. Researchers concluded a management "culture" that allowed the technical staff free rein complicated the situation. They went about their tasks without any check or control, the report said.

The report did not deal with the criticism that people in key positions on the project left state government to work for Tandem or companies closely tied to it. In some cases, they later returned to state payroll. But Assemblyman Richard Katz, D-Panorama City, has asked law enforcement agencies to investigate what he has called "revolving door" relationships. He also has his own investigation under way as chairman of the Assembly Transportation committee. [Green, 1994]

C. CASE 2: CALIFORNIA STATEWIDE AUTOMATED WELFARE SYSTEM

The biggest government computer project in state history – a \$1 billion effort to automate California's welfare system – is 10 years behind schedule and

may never pay for itself, according to a report issued July 10th. "Approximately \$100 million has been spent ... through June 30, 1994, yet only two small counties representing 1 percent of cases statewide are completely automated," State Auditor Kurt Sjoberg reported. Even then, the report said, the computer system being used by the state "is not economically viable and exposes the General Fund to significant financial risk."

Known as SAWS (Statewide Automated Welfare System), the welfare automation project is the second major technology venture to bedevil the Wilson administration in as many years. Last year, the department of Motor Vehicles admitted that it had spent roughly \$50 million on a computer system that never worked as intended.

Administration officials, however, insisted that the SAWS project – which Sjoberg's auditors estimated would consume more than \$1 billion by the time it was done – was not another DMV fiasco. "The difference is that they (DMV) turned on the switch and it didn't work," said Thomas P. Nagle, undersecretary of the Health and Welfare Agency. "Here, we have a project that works."

How well it works, and at what cost, is open to debate, however. "Recent statements by the department that the product works give no clue of what it is costing to make it work, nor that the project may not pay for itself until; the next century," the report stated.

Said Assemblywoman Debra Bowen (D-Torrance), "The difference between this and DMV is that we caught it in time. If we hadn't, we would have had the same result." Bowen, who pushed for the SAWS audit last year in the

wake of the DMV scandal, said the two projects were similarly mismanaged and both gave private companies lucrative state contracts that placed all the risk of failure on the taxpayers.

According to the auditor's report, no one has any idea how much tax money has been spent on the SAWS project so far. The auditors were reduced to guessing that it was around \$100 million. "We found no evidence that the Department of Finance or the federal control agencies ever asked for, or received, any reports of what has been spent to date or how actual costs compare with originally budgeted amounts," the auditors said.

The SAWS project was started in 1984 after an earlier effort to automate the states' \$18.4 billion welfare program collapsed. As originally envisioned, SAWS would hook up all 58 counties to a central computer that would contain information and case files on nearly every public assistance program offered by the state, including food stamps, AFDC, MediCal, foster care, the refugee program and county medical services.

The idea was that a needy person could come into a county welfare office and quickly be interviewed, pre-qualified and given an estimate on the amount of state assistance they could obtain. It was supposed to cut down on fraud and errors, which costs millions a year. SAWS also would save millions by reducing the number of welfare workers needed.

But the auditors said the project was poorly planned from the beginning, with underestimated costs and overstated benefits. Among the findings:

- In Napa County, which is currently the only county with a fully functional SAWS-based system, an expenditure of \$21.9 million has produced annual savings of \$231,000. But even that may be illusory, the report says, since the system's response time is so slow that the vendor, Unisys Corporation recommended a "newer and faster mainframe computer" for Napa County that could cost more than \$1 million. The state says Unisys installed another instruction processor on the mainframe last February that has speeded up response times.
- No one knows if there has been any reduction in the number of benefit errors made because there were never any "statistically valid" error rate measurements taken in any of the 14 counties scheduled to receive the first SAWS systems. "It is impossible to measure any change in error rates before and after automation," the report said.
- While counties were supposed to save money by eventually replacing their own data processing departments with the state's SAWS system, the state chose to use a proprietary system that runs only on Unisys hardware and software, which the counties would have to purchase. As a result, the auditors said, "existing equipment costs may not go down as much as the state expects."
- The system software, a Unisys-made data base management system called MAPPER is "inefficient," and "not suitable for competitive procurement statewide." The auditors called the technology "outdated." A Unisys representative, who asked not to be named, defended the

MAPPER system, but the state says it will soon be changing to another system.

The report recommended that the Legislature not provide any more money for the SAWS system beyond that necessary to fund the project for six months, and to re-evaluate the entire process. Currently, nine counties are in the process of installing the SAWS system and another five are scheduled to be on-line by summer.

Health and Welfare Agency Director Sandra Smoley said the project is being taken away from the Department of Social Services and given to the Health and Welfare Data Center to manage, but she and Nagle insisted the SAWS project would continue. "We're not backing away," Smoley said. "We feel an obligation to roll forward."

Bowen, however, said that is unlikely. "It simply cannot be business as usual after this," she said. "This (report) is too much to sweep under the rug."
[Webb, 1997]

D. CASE 3: FEDERAL GOVERNMENT IT FAILURES

After pumping millions into computer systems the past two decades, the federal government has compiled a record of ineptitude that has jeopardized the United States' welfare, eroded public safety and squandered untold billions of dollars. While most of America is rushing headlong into twenty-first century information technology, much of the government is operating with computers designed and built when Studebaker was making cars. The government's

1960s-era computer systems – as well as those from the 1970s and 1980s – are generally antiquated, unreliable, inefficient, error-prone and expensive.

At a time when many Americans communicate by e-mail, government agencies fly magnetic tapes around the country. At a time when microprocessor designs are updated every six months, the government uses computers with vacuum tubes. At a time when corporations can deliver a product overnight to a customer across the United States, the government can take six months to execute a simple administrative task.

Every taxpayer pays a share of the price for the government's outdated technology. But some individuals, such as Cathy Sandez of Fontana, are random victims. Sandez, who has multiple sclerosis, was denied the Social Security disability benefits she was owed for four years because the agency's computer had misplaced her earnings records. As a result, she lost her home and car and accumulated \$60,000 in medical debts.

Sandez is not the only one wandering in the Social Security Administration's electronic lost and found. Altogether, the agency's computers are unable to match \$234 billion in wages to the individuals who earned them, according to an internal agency report obtained by the Los Angeles Times. And the Social Security Administration is widely regarded as one of the best federal agencies at information technology and computer modernization.

The scope of its failure to adopt modern technology is poorly understood because the government is so big and so spread out. Spawned by convoluted

federal regulations and poor planning, the failure has during the past two decades extended to virtually every federal agency, court and office of Congress.

Although senior government leaders acknowledge that their information technology has gone badly off track, there are indeed areas of excellence. In battle management at the Pentagon, aerodynamic simulation at the National Aeronautics and Space Administration and nuclear bomb design at federal labs, the government has demonstrated it can develop leading-edge systems.

Information technology often tests the mettle of private corporations as well, but on balance the government's record stands out as poor, particularly in business systems that affect the public. Services that the public expects to receive are not delivered or are performed incompetently. Government agencies depend on clerks to perform administrative tasks that private businesses have automated.

Lack of modern technology can make getting a reservation for a hotel or a campground at a national park a frustration. At the extreme, public safety is jeopardized and lives are at risk. For example, at least three airline accidents might have been prevented had the Federal Aviation Administration not fallen behind schedule in planned modernization of air traffic control equipment, experts say. Poor weather forecasts during the 1993 Mississippi River floods, blamed in part on outdated National Weather Service technology, left some communities exposed to avoidable death and destruction.

In the broadest sense, the failures have undermined the federal government's role as a provider of public services. Few aspects of government

have shaped public perception more in the past decades than federal inefficiencies that result from not having modern information technology. Software codes and silicon chips determine in large part how well the government spends its \$1.6 trillion annual budget.

“A lot of the cause of the public’s lack of confidence in the government to perform” said Steven Kelman, a Harvard University professor on leave who is spearheading the Clinton administration’s reform efforts as administrator for federal procurement policy. He says the political movement to reduce the federal government, to reassign some tasks to states and others to the private sector, reflects the public’s frustration in its day-to-day contacts with the government.

Kelman admits that, judged by his own contacts with the Internal Revenue Service and the State Department’s passport office, some agencies’ abilities to operate in the modern era are “really pathetic.” Why so much has gone wrong for so long could fill an encyclopedia.

Some federal agencies have attempted computer modernization’s so complex that they have taken as long as 15 years to complete. The systems are obsolete from the moment they are turned on. Others have embarked on multimillion-dollar modernization efforts so poorly planned that they are destined to fail, according to General Accounting Office experts. Then, when they start over, they are even further behind technologically.

Political appointees come and go, typically in a few years; they focus on short-term goals and pay scant attention to technology modernization. That job is left to the career civil service, but the best career executives in technology flee

the government, lured by higher pay and fewer frustrations in the private sector. “It is a sorry litany of errors that would not be tolerated in private business,” said Paul A. Strassmann, an author and former chief information officer at Xerox, Kraft, General Foods and the Defense Department. “You are talking about big bucks and a big monster” [Vartabedian, 1996].

E. SUMMARY

The above case studies show the consequences of IT projects that fail. What they do not show is how these projects creep towards failure without anyone recognizing the warning signs until it is too late. Appendix A is a Harvard Business School case study that shows the drift of the Hong Kong TRADELINK project towards failure. Clearly, something is wrong with the way IT systems are currently implemented.

III. EXIT STRATEGY

A. BACKGROUND

The concept of an exit strategy first began to emerge in American politics with the Weinberger Doctrine [Weinberger, 1984]. It was codified with the 1986 Goldwater/Nichols Act requiring the President to provide annual security strategy reports. It has evolved in time through the National Security Strategy statements of Presidents Reagan, Bush and Clinton [The White House, 1987-1997] and has become a common element in the planning stages of recent military operations [Strednansky, 1995].

An exit strategy, as applied to National Security Strategy and military operations, is a formalized method of ceasing hostilities once a set of political goals have been achieved or the associated costs of achieving those goal have been deemed as too expensive. The exit strategy concept has spread today into other social systems. From founders of start-up corporations looking to capitalize on the success of their business, usually through Initial Stock Offerings (IP's) [Stiennon, 1997], to large corporations planning to liquidate real estate holdings that become unproductive [Hellmuth, Obata, and Kassabaum, 1997], exit strategies have begun to emerge in today's corporate management philosophies.

Corporate exit strategies have evolved into a formal method, usually in the planning stage, to enact the timely change to a new methodology when the current (or proposed) system has become outmoded.

B. ORIGINS OF CONCEPT

When the United States chooses to participate in low intensity actions, it should establish or be given well-defined goals and objectives [Weinberger, 1984]. However, even specific goals may not necessarily translate into planned exit strategies or a clearly identifiable conflict termination. During the Cold War it was simpler to identify what was considered a vital interest to the United States' national security. Conflicts were perceived as "proxy wars" [Bade, 1994] because one, or both, of the two superpowers supported them. Due to the fear that confrontations might escalate to the use of nuclear weapons, there were inherent limitations placed on the amount and use of forces in these conflicts.

With the end of the Cold War years these constraints no longer exist. The world has become a much more confusing place [Huntington, 1993]. Issues are no longer bipolar. Instead of the two superpowers dictating world politics, countries have found they can influence events within their region of the world. A single conflict may involve numerous countries with competing objectives. Operations other than war (i.e. peacekeeping, humanitarian, etc.), although not new mission areas [The White House, 1994], are becoming more common in today's world. Political and economic criteria instead of ideology are playing an increasingly stronger role in determining the use of military power for intervention [Bade, 1994], be it for aggressive or humanitarian purposes.

With the confusion surrounding today's issues an exit strategy is desirable. The lack of an exit strategy in any military intervention could result in reduced confidence in leadership, drop in troop morale and the possibility of

increased casualties. This may negate any of the successes achieved by the actual intervention and cause public support to falter [Wheaton, 1997]. An exit strategy must be flexible enough to accommodate changes in political goals and military objectives, the effects of Clausewitz's "the fog of war" and "friction" during battle [Handel, 1992] and changing coalition political desires. A viable end state, along with a strategy for termination and conflict exit, should drive the ways and means for the execution of the intervention. All that said, it may not be simple to devise a workable strategy due to the uncertain nature of conflicts and even a precise strategy may not lead to the desired termination objectives state [Strednansky, 1995].

C. WEINBERGER DOCTRINE

In the two decades since the end of the Vietnam War, much military and political thought (literature review follows) has been dedicated to the issue of U.S. involvement in conflicts around the world [Wheaton 1997]. This intellectual discussion led to the Goldwater/Nichols Act of 1986. Specifically, decision-makers in Congress wanted to avoid another situation such as they faced in Vietnam. Although there is a great deal of literature discussing when the United States should intervene with military forces, the most notable discussion came from the former Secretary of Defense Caspar W. Weinberger. In a 1984 speech, he outlined six conditions (subsequently discussed in detail) which a conflict should meet before the United States would consider getting involved. Weinberger called these conditions an intervention test that, in his mind, would prevent another quagmire and ensure "firm national resolve . . . to achieve our

objectives.” [Weinberger, 1984] These principles became the “touchstone for the use of military power.” [Spara, 1993]

In view of the complexity of recent changes in global politics and alliances these principles warrant a closer look to determine how they affect conflict termination. The decision to intervene in Weinberger’s analysis is dependent on a clear definition of mission accomplishment. Therefore, the analysis offers an insight into exit strategies as the two concepts are interdependent. The six principles are:

1. The conflict should be of vital interest to the United States or its allies.
2. Sufficient force should be applied to unequivocally reflect the intention of winning. (i.e., no half-hearted measures).
3. Political and military objectives must be clearly defined.
4. Political and military objectives must be continually reassessed to keep cause and response in synchronization.
5. Before troops are committed, there must be a reasonable assurance of support from American public opinion.
6. A combat role should be undertaken only as a last resort.

[Weinberger, 1984]

There are many reasons that make it difficult to develop a successful termination strategy. In future conflicts, the United States will likely be a part of a coalition or a United Nations group. The various other partners may have different perceptions of what the end game should be, what means should be employed to reach it and how much time and effort they are willing to expend to

achieve their original goals. Ironically, political and military experts have spent a lot of time thinking about entering a conflict and spend much energy on winning, but there is very little planning devoted to the conflict termination itself. This is partly because no one knows precisely how the conflict will develop and often there is only broad political goals articulated by the civilian leaders [Strednansky, 1995]. Additionally, it may be very difficult if not impossible to translate the political objectives into tangible end-state conditions.

D. LITERATURE REVIEW

As the United States prepares to enter the next century it must not only carefully consider valid criteria for entering conflicts but also plan how to terminate them. Therefore, exit strategy and conflict termination planning must become a part of the military culture and must be included as a requirement in joint planning. In a study of classical literature that deals with terminating major wars it was discovered that most of the discussion on exit strategy planning began post Vietnam era and has not received serious attention until as recently as Desert Storm. Accounts such as *The Generals' War* by Gordon and Trainor [1995] and *Crusade* by Atkinson [1993] only touch upon the issue of exit strategies. While they provide insight into the political machinery, they do not discuss the difficulties of developing a conflict termination strategy. *Every War Must End* by Ikle [1991] is an excellent analysis of external issues that affect hostilities termination, such as the fog of military estimates, nuclear weapons and political objectives. The collection of essays in *Conflict Termination and Military Strategy* by Cimbala and Dunn [1987] identifies how termination goals affect

military strategy. The book was written during the Cold War and its central theme concentrates on wars and the resulting superpower interaction. Nevertheless, it includes several articles on how to end limited wars and conflicts. While the concept of an exit strategy is not formally addressed, Cimbala and Dunn's ideas were a step in that direction. The most comprehensive account concerning the actual problems of war termination came from Bade's essay "War Termination: Why Don't We Plan for It?" [1994]. As the title indicates, the essay examines the military's reluctance to plan for war termination and highlights the reasons why. Bade faults the U.S. mentality by claiming that Americans like to think that war termination will take care of itself.

This comprehensive review of the literature indicates that most authors agree that:

1. Conflict termination planning and the development of an exit strategy prior to or at the beginning of the conflict is a must.
2. Not enough time and thought is dedicated to termination planning.
3. Current doctrine does not provide the necessary guidance to military strategists.
4. And finally, more work in this area is required [Strednansky, 1995].

Having said that, however, the task facing the commanders will remain difficult to accomplish due to the political constraints. Fog, friction, uncertainty, changing objectives and, most importantly, the difficult task of translating often intangible end-state goals into quantifiable military objectives are just a few of the challenges that must be addressed in a successful exit strategy. What the

literature does not address in depth are the difficulties planners face when trying to translate national objectives or goals into quantifiable military goals as well as the military conditions which must be met to achieve the desired end state [Strednansky, 1995].

IV. EXIT STRATEGIES IN CORPORATE PLANNING

A. THE REAL ESTATE INDUSTRY

The concept of an exit strategy has begun to emerge in the business practices of corporate America. The most notable area where it is employed is in the real estate industry. Operating in an environment of constant change, the challenge for real estate professionals is to provide flexible and cost-effective workplace solutions.

It is inevitable that business conditions will change over time, and when they do companies' real estate portfolios must be able to support these changes. Whether it is a simple diagram on a sheet of paper or a complex analysis of multiple scenarios, every corporate real estate group must have a plan for mitigating, if not recouping, real estate investments. The difficulty is that exit strategies are based on predictions of future business needs and real estate market conditions. Corporate America has a need for organizational agility, to quickly respond to volatile business conditions. It cannot always afford to have its capital tied up in costly real estate ventures or rigid lease commitments [Hellmuth, Obata, and Kassabaum, 1997].

The task for corporate real estate professionals is to provide a combination of workplace environments that satisfies an organization's current and future business needs. A second consideration for an effective exit strategy is how to best invest the company's capital. At the same time that companies have recognized the impact that real estate has on the bottom line, many have

reduced their in-house real estate and facilities staffs. Though this may seem ironic at first glance, it makes sense. Companies want to focus on what they do best, which typically is not real estate. The trade off being the companies Internal Rate of Return (IRR) on capital versus the appreciation of the real estate market [Hellmuth, Obata, and Kassabaum, 1997].

B. INTERNATIONAL BUSINESS MACHINES

Craig Anderson, a real estate program manager with 15 years of experience at International Business Machine (IBM) has seen IBM's exit strategies change with the times. He says the one constant over the years has been the desire for a strategy that provides for "the orderly disposition or acquisition of space with as much flexibility as is economically viable" [Hellmuth, Obata, and Kassabaum, 1997]. IBM's real estate exit strategy had been to minimize the financial exposure from its lease obligations. This was related to the difficult times that IBM was facing in the 1990's business environment. "Today, IBM is much healthier and our definition of an exit strategy is changing. Because we have run out of vacant space, our exit strategy may soon include options for growth." When pursuing a lease, IBM tries to maintain as much flexibility as possible. This may include early termination rights, subletting clauses and expansion options.

C. TRAMMELL CROW

The corporate real estate professionals that remain within an organization rely heavily on real estate brokerage and transaction firms to fulfill their facilities

requirements. These firms have special expertise, access to information and experience working in real estate markets throughout the world.

Thomas Lindquist is an Executive Vice President with Trammell Crow Company based in Seattle, Washington. He has been with Trammell Crow, which provides corporate, and property management and developmental services, for ten years. He believes that an exit strategy in the real estate industry means different things to different people. He does believe, however, that an organization developing an exit strategy for real estate investments must examine two crucial aspects of its business, operational and capital considerations, as part of this process.

“By operational considerations,” says Lindquist, “I mean, can a company accurately predict its growth or reduction patterns for a horizon of five or ten years and beyond? Does it have definitive cycles?” [Hellmuth, Obata, and Kassabaum, 1997] If a company is in a cyclic industry its real estate obligations should be as flexible as possible. If a company is not careful, its business operations may change and its real estate and facilities become obsolete.

Real estate obviously requires capital. Organizations should be careful when reviewing the cost and return of their investments in real estate. Says Lindquist, “Can the company guarantee that the rate of return on the capital investment in real estate is going to outstrip or be equal to the internal rate of return (IRR) or its business?” While real estate can be a good investment, some companies can do better internally with their capital by focusing on their core products.

It is important to look at real estate from a shareholder's point of view. When you decide to make a real estate investment, you need to factor in the ability to divest the property on the open market when the asset no longer makes sense from a business perspective. If you invest your capital in a real estate facility you should ensure that it has some residual market value. Says Lindquist, "If you are going to invest your capital, you should ensure that it can come out with some value, even if you have to risk a percentage of that value. Make it a market asset- not a white elephant."

D. CB COMMERCIAL BROKERAGE

Gary Carpenter is the executive managing officer of CB Commercial's Brokerage Company and has been with the firm since 1979 (17 years). For the past four years he has focused on the service provider side of the commercial real estate industry. From a developer's perspective he defines the concept of an exit strategy as "a method of recouping an initial investment in real estate by taking it to the market place within a specified period of time." He further states, "A developer wants to create the highest value and best use for a product so the asset can be turned over to someone else. The exit strategy is to complete that process, get out of that investment, and move on to another opportunity" [Hellmuth, Obata, and Kassabaum, 1997].

Market conditions dictate the exit strategy from the development side of the deal. Because the market is the ultimate decider, a developer may not be able to live up to its original exit strategy. No matter how thorough the original exit strategy, a rapid change in market conditions can waylay the best-laid plans.

Carpenter believes that if a company is downsizing it is better to lease any additional space rather than liquidate the real estate holding. That way if business improves and the company experiences an increase in production they have space available on a predetermined schedule. On the other end of the spectrum, companies that are growing should strive for as much flexibility as possible. While long-term leases are not always possible, they are the most attractive. "By negotiating longer term leases that give them the ability to get out of the lease by paying a penalty," says Carpenter, "astute companies gain flexibility and the ability to quantify all their real estate costs from the beginning" [HOK, 1996].

E. MCCABE-HENLEY

McCabe-Henley is a real estate development, brokerage, and property management firm in Charleston, West Virginia. David Durbin is an executive vice president with the firm and has over 24 years experience in the industry.

According to Durbin, the global economy has had a profound effect on corporate real estate in the last five years as companies have increasingly scrutinized all expenses. "Companies had previously focused more on income. Now they are also looking had at the expense side" [Hellmuth, Obata, and Kassabaum, 1997]. This new focus on expenses has shown organizations not only the inherent value of their real estate holdings, but also the impact it can have on the firm's bottom line. If a corporation has a ten-year lease and the facility shuts down in five years in a bad real estate market the impacts on shareholder value can be significant.

Corporations need to make strategic real estate decisions that provide flexible solutions to house their work forces. “An exit strategy is one or more scenarios that will mitigate the financial impact on a company if parts of its real estate become surplus,” explains Durbin. “The uncertainty that organizations are operating in should make every user of space want to develop what-if scenarios for how they would dispose of real estate.” Exit strategies will be driven more by business activities and functional needs than by market conditions.

V. CONCLUSIONS

Systems technology is playing an ever-increasing role in the business environment. As we shift to a Third Wave society as described by Toffler [1993], successful firms will be defined by their capacity for acquiring, generating, distributing and applying knowledge, both strategically and operationally. Information will be a raw material in the business process and will be treated as a strategic resource. Corporate executives, who have built successful careers hedging decisions by planning for countless “what if” scenarios, have failed to consider the consequences of an Information Technology (IT) system implementation failure.

The study of software engineering projects by Gibbs [1994] showed that two-thirds of all major software projects are canceled during development, the average software project takes fifty percent longer than the estimated development timeline, the larger the project the less likely that it will be completed, and three-quarters of all software projects are considered to be operating failures that do not function as planned or are not used at all. The Department of Defense does not fair any better when it comes to IT implementations. In a review of 17 major Department of Defense software contracts [Saiedian and Kuzara, 1995] the average 28 month schedule was missed by 20 months, none of the projects were delivered on time and system users complained that the delivered system did not meet the stated requirements.

The three case studies in Chapter II and the Hong Kong TRADELINK example in Appendix A show how easy it is to lose control of technology driven projects. Regardless of their scope, from the \$28.5 million California DMV computer system upgrade to United States and foreign government program debacles, the potential for these programs to fail and the consequences of their failures are enormous. It is clear, with so much at stake, that some form of control needs to be added to the process to keep these projects from going astray.

Planners need to incorporate an exit strategy into the implementation process for IT systems. The exit strategy concept is not new. Discussions began shortly after the Vietnam War concerning methods to avoid military forces from becoming involved in a similar quagmire [Wheaton, 1997]. Exit strategy development through national security policies and military operational doctrine was reviewed in Chapter III. The exit strategy concept was first articulated by Weinberger [1984] and was codified by the Goldwater/Nichols Act of 1986.

Exit strategies have begun to emerge in corporate business practices as a formal method, usually in the planning stage, to enact the timely change to a new methodology when the current (or proposed) system has become outmoded. The real estate industry has embraced this concept as was shown in Chapter IV. Other industries have also begun to employ the concept of an exit strategy, yet the practice has not become commonplace.

Managers and corporate executives have come to believe that the implementation of new technology systems will be the "silver bullet" that solves

their current problems and enhances their competitiveness. The fact is, as I have shown, that a high percentage of IT systems implementations fail. Coupled with the “no failure spoken here” culture that is prevalent in management today, IT implementers are doomed to repeat the mistakes of the past. With the stakes so high and the consequences so great, an evolutionary change is required. A periodic review of system measures of performance, coupled with an exit strategy when these metrics are not met is clearly called for.

The cited lessons learned from corporate CEO’s and the case studies have one thing in common. In each example, a new technology based system was implemented without having an alternative plan if things did not progress as anticipated. As I stated earlier, the concept of an exit strategy is not new. What is new is applying this mentality to the information technology systems implementation process. The addition of an exit strategy in the planning stage of the acquisition process will give implementers a formal method to assess the success of the new system. It will also force managers to consider the possibility that the new system might not be the solution to their problems and force them to explore alternative scenarios.

Further research in this area is crucial.

APPENDIX A: HONG KONG TRADELINK

A. BACKGROUND

The United Kingdom established Hong Kong in the early 19th century as a trading colony, part of the British Empire. The colony was built upon Hong Kong Island, which was ceded to the U.K. in perpetuity by the Chinese government. As the colony grew, it expanded beyond the island, and eventually came to occupy a significant part of the mainland (the New Territories) leased by the Chinese government to the U.K. for the period 1898-1997. After extensive negotiations between the U.K. and the People's Republic of China during the mid- to late 1980's, a joint agreement was reached whereby Hong Kong would become part of the PRC in 1997. However, the memorandum of understanding stipulates that Hong Kong will retain its special political and economic character for 50 years past the 1997 hand-over.

A governor appointed by the Queen of England administers Hong Kong, through as a practical matter the governor reports to U.K. Foreign Office. Two councils assist the governor, a Legislative council that enacts local legislation and sets budgetary authority, and an advisory Executive Council. Administration of the Hong Kong Government (HKG) is managed by the chief secretary (formerly called the colonial secretary), to whom most of the secretaries running major HKG agencies report. The attorney general and the finance secretary also report to the chief secretary, though they have more of a peer status with the chief secretary than do the other secretaries. The attorney general is responsible for all Crown prosecutions, while the finance secretary is responsible for the

treasury, trade and other industry, government data processing, and other key administrative functions. Numerous advisory committees involving government officials and citizens help with particular policy issues.

B. ELECTRONIC DATA INTERCHANGE ISSUE

In 1983 the Hong Kong Trade Facilitation Council (TFC), a nonprofit organization of traders, facility authorities (e.g., the port authority), and trade-related agencies of the Hong Kong government, began looking into the possibility of improving trade activities in Hong Kong through use of Electronic Data Interchange (EDI). A study was organized within the TFC to outline a possible EDI project, and in 1984 the TFC made public plans for the construction of a system called Hotline. Hotline was proposed as a centralized data base system of consignment data on all goods exchanged through external trade mechanisms.

The HKG, which had been instrumental in creation of the TFC and was its initial underwriter, was approached to fund the Hotline project. The HKG had problems with the proposal on substantive and procedural grounds. None of the HKG officials who would have to approve the Hotline project and provide funding understood what was being proposed in detail, so it was not easy to sell the concept. No other trade-related EDI was operating in the world, and only limited discussion and planning had taken place in those places contemplating it. Also, TFC had been started with initial support by the HKG, but it was the intent from the beginning to have TFC a self-supporting entity very soon after creation. HKG support of Hotline would have significantly increased the government's

obligations to TFC, and to the thinking of HKG officials, there were not sound grounds for making the investment in the first place.

The HKG response to the Hotline project was that the private sector stood to benefit most from Hotline, and therefore it should undertake the project if it felt the benefits worthwhile. While rational from a market perspective, his suggestion met severe institutional resistance among the members of the trading company. A survey of interested companies revealed the widespread sentiment that the information contained in such a system would be proprietary and competitively sensitive. The HKG, in the minds of various companies, was the only entity that could undertake the project and guarantee fair and equal treatment of all users. Thus, the key blocs within TFC—the HKG and the private companies involved in trade—were at a deadlock on Hotline.

From 1984-1987 the EDI issue was dormant. None of the TFC parties could devise a means of breaking out of the deadlock, and for a while, interest in the issue waned. However, in 1987 several key events occurred that restarted discussions. One was the establishment of the United Nations EDIFACT standard for EDI. This greatly increased the probability that a single EDI format would be adopted for trading use. Another, more local stimulus was the announcement by the Singapore government of a crash program to develop a trade-related EDI system TradeNet. The TradeNet was to use the EDIFACT standard, and it was targeted to be working within two years. This announcement was significant because Singapore, as Hong Kong's nearest and largest trading competitor, was clearly viewing EDI as a major source of

competitive advantage in trade. Also at about this time other, less ambitious trade-related EDI projects were being announced in Norway, the U.K., and other countries. It seemed to some members of the TFC that EDI had moved from “desirable” status to “necessary” status in Hong Kong’s trade future. And there was official support for moving forward provided by the Hong Kong Government’s Advisory Board on Science and Technology, which recommended that the government help make some kind of EDI project happen.

In late 1987 several companies that were members of the TFC decided to pull out of TFC and form their own EDI consortium for the purpose of commissioning and funding a major study of the viability of a trade-related EDI system for Hong Kong. They formed a special company called Tradelink, and commissioned a major consultancy study with the firm Coopers and Lybrand. The HKG, desiring to keep a hand in the ongoing discussion, contributed 10 percent to the cost of the consultancy. [Harvard Business Review 1990]

The following nineteen newspaper articles show the progression of trade-related EDI in Hong Kong:

1. EIGHT HONG KONG COMPANIES HAVE STARTED WORK ON TRADELINK COMPUTER NETWORK

Eight Hong Kong companies have begun work on an international computer network linking Hong Kong’s freight carriers, banks and trading companies. These are China Resources, Hong Kong Air and Cargo Terminals, Hong Kong International Terminals, Maersk Line (HK), Modern Terminals, Swire Pacific, Standard Chartered Bank and the Hong Kong and Shanghai Bank. The government is not a shareholder of the new company, TRADELINK Electronic

Document Services. The formation of TRADELINK is in response to the increasing use of electronic data interchange (EDI) systems to reduce paperwork. TRADELINK is expected to begin operation in 1990, almost a year after Singapore is scheduled to launch its EDI, TradeNet.

Shipping Times 11/1/88, p. 1.

2. TRADELINK COMPUTERISED PAPERWORK SYSTEM GIVEN GO AHEAD

A final report from Coopers and Lybrand on the practicalities of setting up a computerised network to handle trade paperwork in the territory will recommend that the project goes ahead despite concerns over its economic viability. The TRADELINK consortium proposing the project is expected to decide whether to provide a paperless trading service in Hong Kong before October 4, when the group will participate in a conference on electronic document interchange (EDI).

South China Morning Post (Business News) 8/27/89, p. 3.

3. TRADELINK DENIES DROPPING PLANS FOR DATA INTERCHANGE SERVICE

TRADELINK, the consortium of 11 companies set up to establish a comprehensive EDI service in Hong Kong, has said no decision on the project has been made. An EDI feasibility study by Coopers and Lybrand is believed to have run over its HK \$6 million government provided funding and is already two months overdue. TRADELINK did not say whether Cooper's draft report had recommended the project be abandoned. TRADELINK project manager Juletta Broomfield said a statement would probably be made in October.

South China Morning Post (Business News) 8/22/89, p. 11.

4. CABLE AND WIRELESS TO LAUNCH EDI SYSTEM

Cable and Wireless has decided not to wait for the findings of a feasibility study commissioned by the TRADELINK consortium about an electronic data interchange (EDI) system in Hong Kong. The company will launch its own EDI system in Hong Kong on June 5, about a month before the results of the Coopers and Lybrand study are handed to TRADELINK. According to Cable and Wireless, the move is nothing unusual. Plans for the system, to be called Intertrade, have been underway since early last year, well before TRADELINK was formed.

South China Morning Post (Business News) 9/9/89, p. 11.

5. TRADELINK ANNOUNCEMENT ON EDI EXPECTED NEXT MONTH

TRADELINK Electronic Document Services is next month expected to make a preliminary announcement on its role in setting up a territory-wide electronic data interchange (EDI). The group-composed of 11 Hong Kong organizations-is investigating the feasibility of EDI in Hong Kong. Anthony Charter, managing director of Hong Kong Air Cargo Terminals and newly appointed chairman of TRADELINK, said "EDI has already proved its worth in the highly competitive air transport industry and I am not in any doubt that it will become an essential way of doing business for much of Hong Kong's trading community in the future. The only question that has to be resolved is to what extent Hong Kong would benefit from a coordinated approach."

South China Morning Post (Business News) 9/4/89, p. 3.

6. AGENDA: ELECTRONIC DATA CONFERENCE

With so many people (still) waiting to hear the recommendations of the Coopers and Lybrand report commissioned by TRADELINK on the feasibility of electronic data interchange in Hong Kong, the two-day EDI Asia '89 conference which starts at the Exhibition Centre today should generate a lot of interest ... TRADELINK's new chairman, Anthony Charter, will reveal all tomorrow when he delivers a talk on the coopers and Lybrand consultancy study and the future role of TRADELINK in the application of EDI in Hong Kong. For most observers, the question of whether or not EDI is the wave of the future for Hong Kong has already been answered. It will be. The questions that remain are when substantial services will be adopted by Hong Kong, who will provide those services (and the hardware involved), and what kind of system will be implemented. The principal sponsor of the conference program is everyone's favorite computer monolith, Big Blue. Then, sponsoring everything from speeches to lunches to cocktail receptions, is Hewlett Packard, American Telephone and Telegraph, Digital Equipment, ICL, Hong Kong Telephone, Cable and Wireless, Intertrade, NYNEX, McDonnell Douglas Information Systems, International Network Services, Singapore, Computer Systems and even relational database specialist Oracle. Not to be seen left out of the event, the Government is also involved in the sponsorship program through both the Hong Kong Productivity Council and the Hong Kong Trade Facilitation Council.

South China Morning Post (Business News) 10/3/89, p. 12.

7. TRADELINK ELECTRONIC SCHEME TO PROCESS TRADE DOCUMENTS UNDER STUDY

The Government is considering a proposal that would allow a private company to provide an exclusive franchise service to process government-related trade documents electronically, according to Secretary for the Treasury Hamish McCleod. The proposal was submitted last week by TRADELINK ...

TRADELINK's initiative to form a public and private sector "partnership" to process government trade documents was also under consideration, he said.

"We do not rule out, at this stage, any possible options in developing trade related EDI in Hong Kong," Mr. McCleod said. TRADELINK chairman Anthony Charter said the report had found that the potential market for EDI services could be as high as \$10 billion by the turn of the century, but that due to constraints unique to Hong Kong, the realizable market had been estimated between \$1 billion and \$1.5 billion. He said the market size was restricted by the resistance of smaller companies to computerization; a lack of standards for the development of Chinese language EDI; a low awareness of the real costs of handling paper documents; and the legal constraints that the electronic documents presented.

The granting of an exclusive franchise would help overcome these constraints, and speed the overall adoption of paperless trading in Hong Kong, he added.

The franchise should be granted in return for an obligation to explore low cost access to EDI for Hong Kong's numerous small traders and to help develop and establish Chinese-language EDI standards ... Mr. Charter said the setting up of an EDI service could require an investment of up to \$500 million over the next 10 years. Mr. Charter said that while the EDI gateway to the government should be franchised, the open market should dictate the development of electronic

document gateways between domestic trading partners, and between Hong Kong and overseas trading partners.

South China Morning Post (Business News) 10/5/89, p. 1.

8. DATA INTERCHANGE SEMINARS OFFERED

The latest in a series of seminars organized by TRADELINK to prepare Hong Kong business for the advent of EDI... "Although EDI is correctly described as a business function rather than a technological one, its implementation demands specialist software and telecommunication links," seminar leader John Sanders said. "Therefore the businessman needs to have a broad understanding of the technical issues involved, so that he knows the right questions to ask suppliers, and can be sure of acquiring the right software and communication services," he added. Mr. Sanders said that because TRADELINK was independent of any vendor, the seminar would not make specific recommendations for any particular EDI product or service...

South China Morning Post (Business News) 10/16/89, p. 4.

9. WORLD NOT READY FOR EDI IMPLEMENTATION

It seems that we are subjected to "experts" talking on Electronic Data Interchange (EDI) on a daily basis. The questions which loom up in my mind are: Are the "experts" talking to the right audience? And, even if they are, does the audience understand what they are talking about? It hardly needed a multi-million dollar consultancy study to tell us that there was a myriad of small companies here that would need training in the fundamentals of information technology before any standardized electronic document exchange could be

introduced. Taxpayer's funds paid for part of the TRADELINK study, for which we are now told that the consultants were given the wrong terms of reference.

The TRADELINK organization is claiming that all is not lost because of that and has turned to the Government for a commitment for exclusivity for electronic document handling. This, it said, would enable EDI to be introduced on a commercial basis, provided it was linked to a Government-backed no-loss guarantee for the trading organization. Commercial Utopia supreme, it would appear. While I have no argument with preparing for the day when all documents will be transferred electronically, I believe that the hype about EDI today is misplaced and premature. There is much to be done worldwide before a total EDI environment can exist, and most of the responsibility lies at the user end, not with the technologists, although some important technological implementations must occur. International standards for documentation must be agreed and implemented by all parties for EDI to be successful. Anyone who has been remotely connected with the freight and shipping industry will be aware that this is no mean task. It not only involves collaboration between private industry, but it also demands conformity by relevant government bodies all over the world. ... I do not mean to discourage the activity, which surrounds EDI in Hong Kong today, but I do think that it could be a little more pragmatic and less theoretical.

South China Morning Post (Business News) 10/31/89, p. 13.

10. FIRMS URGED TO SEIZE LEAD IN EDI GROWTH

BANKS in Hong Kong and other major banking and finance centres could lose their traditional data interchange business unless they take the lead in developing a standard global electronic data interchange (EDI) network, according to a banking and finance computer consultant. ... While stressing that "what Hong Kong and Singapore are doing is a step in the right direction", Mr. Griggs said that, like other major trading centres, "they are responding to market pressures in the fight to remain competitive". Many of the systems that would easily extend to taking over much of the traditional banking aspects of trade finance. "Unfortunately, banks generally are not part of the movement and are in danger of being left out," Mr. Griggs said.

South China Morning Post (Business News) 11/2/89, p. 14.

11. GROUP STEPS UP CAMPAIGN ON DATA EXCHANGE

The TRADELINK consortium has intensified its lobbying of the government for an exclusive franchise to computerize the processing of all government trade related documents. The proposal has drawn heavy criticism from some sectors of the high technology industry which claim that electronic document processing would be better serviced in a free-market environment. ... The controversial proposal would include a safety net of government subsidies to ensure its profitability during its introduction. TRADELINK chairman Anthony Charter said the project would require a total investment of "considerably more" than \$500 million over 10 years. Mr. Charter said that an exclusive franchise should be granted for EDI processing of government documents to ensure a system of standards was established and that the territory's vast number of small

trading companies were encouraged to adopt the system. He warned that unless the government said it intended to adopt the EDI before the end of the year, it was likely that the TRADELINK members would withdraw the proposal and dissolve the company.

The group said it had spent \$14 million investigating EDI in Hong Kong. ... Mr. Charter said unless Hong Kong traders adopted EDI practices they could become less competitive in international markets. "I believe (EDI) should be ranked at least equal in priority to major physical infrastructure projects like the new airport," Mr. Charter said. "In this situation where you have a slow take of (EDI) in the early years, there is an implied subsidy that would be required from government," he said. "They subsidize roads and they subsidize airports- this is part of the infrastructure and if necessary they should subsidize it in the early years until it can stand on its own feet." The Hong Kong Information Technology Federation (HKITF), a 120-member high technology industry group, has responded to the TRADELINK proposal.

South China Morning Post (Business News) 11/16/89, p. 4.

12. COUNCIL TO PROMOTE JOINT RESEARCH URGED

LEGISLATIVE Councilor Professor Poon Chung-Kwong last week urged the Government to establish an autonomous council to coordinate joint research efforts between the public and private sectors. Professor Poon, who is also the chairman of the Government's Committee on Science and Technology and the head of the Hong Kong University's science faculty, said Hong Kong lacked a centralized body to formulate and implement long-term technology projects. ...

The recent proposal by the TRADELINK consortium that it be granted a franchise to establish an electronic data interchange gateway to Government was a good example of where an established and powerful committee could be of use in making technology decisions, he said.

South China Morning Post (Business News) 11/21/89, p. 13.

13. TRADELINK MAKES ITS CASE FOR EDI TO IT FEDERATION

In an attempt to bolster support for its electronic data interchange (EDI) initiative, TRADELINK last week met with Hong Kong Information Technology Federation (HKITF) representatives in the hope of winning support from the powerful trade group. ... There were some committee members that felt that if a franchise were granted, it be for an EDI gateway alone, and should not include and pre-processing...

South China Morning Post (Business News) 11/28/89, p. 12.

14. GOVERNMENT TO DECIDE ON TRADE USES OF EDI

The trading community in Hong Kong should know by the end of the month whether or not the Government is serious about plans to introduce electronic data interchange (EDI) to Hong Kong. Whatever the Government decides about its EDI plans, any announcement on the subject is likely to raise plenty of eyebrows among the local trading community. ... The Government has given TRADELINK a commitment that it will indicate by the end of the month whether the group should proceed with further investigation and pilot projects-or that it deems the idea unfeasible. The Government's thinking on the proposal is not known, so it is impossible to guess whether or not the investment in

TRADELINK by its shareholders will eventually pay its own way. But even if TRADELINK should disband, the company has already been an outstanding success as the principal impetus behind all the current talk about the EDI concept.

South China Morning Post (Business News) 3/4/90, p. 12.

15. SEMINAR ON PAPERLESS TRADE

The Hong Kong Shippers' Council is organizing a one-day seminar to increase awareness of existing paperless communication systems while businesses wait for the TRADELINK Electronic Data Interchange (EDI) network to start up. The seminar is organized in conjunction with Intertrade, an EDI service run by Cable and Wireless (HK), and will be presented by Cantonese at the Hong Kong Convention and Exhibition Centre on April 12...

South China Morning Post (Business News) 3/13/90, p. 4.

16. HK "WILL LOSE OUT WITHOUT MORE IT"

The Hong Kong business community must become more aware of the opportunities that information technology (IT) offers and the problems that must be overcome in implementing that technology if the territory is to remain competitive in the region Legislative Councilor Mr. Stephen Cheong Kam-Cheun said yesterday. Officially announcing the local industry's biggest-ever technology event, Information Technology Week (IT Week)-which is scheduled for September-Mr. Cheong said Hong Kong had fallen behind some Asian competitors in the adoption of technology. There were key technology issues facing Hong Kong that had to be addressed as soon as possible if the territory

were to maintain its position in Asia as a financial and industrial centre. ... "Hong Kong has had the misfortune of falling behind other territories like Taiwan, Korea and Singapore," Mr. Cheong said. "It is now our duty and our hope that we will catch up-and given the Hong Kong people's tremendous appetite for learning and tremendous energy I am sure that we can get on with it," he said. ...

South China Morning Post (Business News) 3/20/90, p. 12.

17. GOVERNMENT IN EDI VENTURE WITH TRADELINK

The Government plans to set up a joint-venture project with TRADELINK Electronic Document Services to develop a system of "paperless trading", the acting Secretary for Trade and Industry, Mr. Joseph Wong Wing-Ping announced yesterday. Funding for the \$9 million venture will be shared equally by the government and TRADELINK. The project will develop a business plan and technical specifications for a long awaited community-wide system of electronic data interchange (EDI) for Hong Kong. Called SPEDI-Shared Project for EDI-the study will be completed by the end of the year.

South China Morning Post (Business News) 3/21/90, p. 3.

18. EDI JOINT VENTURE "HALF-HEARTED STEP"

Local industry groups have responded coolly to the Government's announcement last week that it had entered a \$9 million joint venture, Shared Project for EDI (SPEDI), with TRADELINK to develop a business plan for the introduction of electronic data interchange (EDI) in Hong Kong. Spokesman for the Hong Kong Telecommunication Users Group and the Hong Kong information Technology Federation's EDI committee said the joint-venture was a half-hearted

step forward, and complained that the Government was still dragging its feet in making a solid commitment to adopting paperless trading practices. The spokesman questioned the likely benefits that would be derived from the study, given its limited \$9 million budget, and expressed concern that it would simply retrace the steps of the consultancy study carried out by Coopers and Lybrand on behalf of TRADELINK last year. "I am extremely disappointed," said HKITF EDI committee chairman Mr. Roy Grubb. "We believe that the Government should be taking the bull by the horns and doing (EDI) for themselves-at the very least for their own paperwork. ...

South China Morning Post (Business News) 3/27/90, p. 12.

19. TALKS ON CHINESE EDI

Talks between Hong Kong and mainland electronic data interchange (EDI) experts to develop Chinese-language messaging standards have been scheduled for later this year following an exploratory meeting of representatives in Beijing recently. The discussions will aim to establish common character sets and internal codes for Chinese language data processing, Chinese versions of UN-EDIFACT (the international message standard for EDI), and trading terms and definitions. With the involvement of Taiwan, also represented at the Beijing meeting, it should be possible to develop Chinese language applications of EDI that can be used throughout China, Hong Kong and Taiwan, and internationally.

South China Morning Post (Business News) 5/22/90, p. 12.

LIST OF REFERENCES

- A National Security Strategy of Engagement and Enlargement*, annual report, The White House, July 1994.
- Atkinson, Rick. *Crusade: The Untold Story of the Persian Gulf War*. New York, Houghton Mifflin Company, 1993.
- Bade, Bruce C. "War Termination: Why Don't We Plan for It?" *Essays on Strategy XII*. Edited by John N. Petrie, Washington, D.C., National Defense University Press, 1994.
- Dunn, Keith A. "The Missing Link in Conflict Termination Thought: Strategy." *Conflict Termination and Military Strategy: Cohersion, Persuasion, and War*. Edited by Stephen J. Cimbala. Boulder, CO, Westview Press, 1987.
- Gibbs, Wayt W. "Trends in Computing: Software's Chronic Crisis." *Scientific America*, September 1994, Vol. 271 #3.
- Gordon, Michael R. and Trainor, Bernard E. *The Generals' War: The Inside Story of the Conflict in the Gulf*. Boston: Little, Brown and Company, 1995.
- Green, Stephen Green. "DMV Computer System a Failure!" *The Monterey county Herald*, 26 May 1994.
- Haga, William J. Class lectures, The Naval Postgraduate School, Spring 1996.
- Hamming, Richard. Class lectures, The Naval Postgraduate School, Fall 1996.
- Handel, Michael I. *Masters of War: Sun Tzu, Clausewitz and Jomini*. Great Britain: Frank Cass and Co. LTD., 1992.
- Hellmuth, Obata and Kassabaum. The HOK Consulting Report, Available at <http://www.hok.com/publications/printfourms/printfourms.html>, 3 July 1997.
- Huntington, Samuel P. "The Clash of Civilizations?" *Foreign Affairs*, summer 1993.
- Ikle, Fred C. *Every War Must End*. New York: Columbia University Press, 1991.
- King, John and Konsynski, Benn. "Hong Kong TradeLink: News from the Second City," Harvard Business School, case 191-026, 1993.

Lazowska, Edward. "20th Annual Faculty Lecture," University of Washington, Available at <http://www.cs.washington.edu/homes/lazowska/faculty.lecture>, March 1996.

Liddle Hart, B.H. *Strategy*. New York: Penguin Books USA Inc., 1991.

National Security Strategy, Annual report, The White House, 1987-1997.

Negroponte, Nicholas. *Being digital*, New York: Vintage Books, 1995.

Saiedian, Hossein and Kuzara, Richard. "SEI Capability Maturity Model's Impact on Contractors." *IEEE Computer*, January 1995, Vol. 28 #1.

Schneidewind, Norman. Class lectures, The Naval Postgraduate School, Fall 1996.

Shailaja Neelakantan. "Tech goofs," *Forbes*, December 1996.

Spara, Jeffrey L. "Peace-Enforcement and the United States Military for the Start of the 21st Century," Fort Leavenworth, Kan., School of Advanced Military Studies, May 1993.

Stiennon, Richard. "Starting An Internet Service Provider," Available at <http://www.knowledgetech.com/~richard/ISP/index.html>, June 1997.

Strednansky, Susan E. "Balancing the Trinity: The Fine Art of Conflict Termination," School of Advanced Airpower Studies, Air University, Maxwell Air Force Base, Alabama, 1995

Sridhar, Suresh. Class lectures, The Naval Postgraduate School, Summer 1996.

Toffler, Alvin. *War and Anti-War: Survival at the Dawn of the 21st Century*, Boston: Little, Brown and company, 1993.

Trotman, Alex. "Ford Chairman sees Growing Valley Ties," *San Jose Mercury News*, 8 September 1997.

Vartabedian, Ralph. "Why government systems don't work well," *San Jose Mercury News*, 8 December 1996.

Weinberger, Caspar. "The Use of Military Power," speech, National Press Club, Washington, D.C., 28 November 1984.

Webb, Gary. "Another computer fiasco on horizon," *San Jose Mercury News*, 1997.

Wheaton, Eric Col., USAF (ret.). Interview with author, 2 Sept. 1997.

INITIAL DISTRIBUTION LIST

| | No. Copies |
|---|------------|
| 1. Defense Technical Information Center 8725 John J. Kingman Rd., STE 0944 Ft. Belvoir, VA 22060-6218 | 2 |
| 2. Dudley Knox Library Naval Postgraduate School 411 Dyer Rd. Monterey, CA 93943-5101 | 2 |
| 3. Barry Frew, Code SM/Fw Naval Postgraduate School Monterey, CA 93943-5101 | 2 |
| 4. Dr. William J. Haga, Code SM/Hg Naval Postgraduate School Monterey, CA 93943-5101 | 2 |
| 5. LT Todd W. Pugh Safety Officer USS Guam (LPH-9) FPO AE 09563-1640 | 4 |

DUDLEY KNOX LIBRARY



3 2768 00341285 9